

IN THE CLAIMS

- 5uM
G3
1. A heat exchange panel, comprising:
 a first layer;
 a second layer having a common border with the first layer;
 a border seal for sealing the first layer and the second layer at said border; and
 a dot matrix of attachments between the first layer and the second layer and within said border, the dot matrix organized into first lines and second lines for connecting dots of said dot matrix to nearest dots of said dot matrix, said first lines crossing said second lines at an angle in a range of about 70° to 110°.
2. The panel of claim 1, wherein:
 the heat exchange panel is for passing a flow of a fluid; and
 said first lines and said second lines have an angle in a range of about 25° to 65° with respect to a nominal direction of said flow of said fluid.
3. The panel of claim 1, wherein:
 the border seal includes smooth ripples having ripple lengths substantially shorter than the length of said border.
4. The panel of claim 1, further comprising:
 a first port for passing a fluid into the panel.
 a second port for passing said fluid out of the panel; and
 at least one fence for sealing the first layer and the second layer between the first port and the second port.
5. The panel of claim 4, wherein:
- 5uM
G3
F2
- 5uM
G3
F2
- 5uM
G3
F2

the fence includes smooth ripples having ripple lengths substantially shorter than the length of the fence.

6. A method of manufacturing a heat exchange panel, comprising steps of:

sealing a first layer to a second layer at a common border; and

attaching said first layer to said second layer within said border with a dot matrix of attachments, said dot matrix organized for connecting dots of said dot matrix to nearest dots of said dot matrix, said first lines crossing said second lines at an angle in a range of about 70° to 110°.

7. The method of claim 6, wherein:

said heat exchange panel is for passing a flow of a fluid; and

one of (i) said first lines and (ii) said second lines has an angle in a range of about 25° to 65° with respect to a nominal direction of said flow of said fluid.

8. The method of claim 6, wherein:

the step of sealing includes sealing said first layer to said second layer with a border seal having smooth ripples having ripple lengths substantially shorter than the length of said border.

9. The method of claim 6, further comprising steps of:

constructing first and second ports for passing a fluid into and out of said panel; and

sealing said first layer to said second layer with at least one fence between said first port and said second port, said fence having smooth ripples having ripple lengths substantially shorter than the length of said fence.

10. A method for exchanging heat, comprising steps of:
 receiving a fluid flow in a first port;
 restricting a passage of said fluid flow between a first layer and a second layer;
 further restricting said passage with a border seal at a common border between said first layer and said second layer;
 passing said fluid flow through a dot matrix of attachments organized into first lines and second lines, connecting dots of said dot matrix to nearest dots of said dot matrix, said first lines crossing said second lines at an angle in a range of about 70° to 110°; and
 issuing said fluid flow through a second port.

11. The method of claim 10, wherein:
 one of (i) said first lines and (ii) said second lines has an angle in a range of about 25° to 65° with respect to a nominal direction of said fluid flow.

12. The method of claim 10, wherein:
 said border seal includes smooth ripples having ripple lengths substantially shorter than the length of said border.

13. The method of claim 10, further comprising a step of:
 further restricting said fluid flow with at least one fence between said first port and said second port.

14. The method of claim 13, wherein:
 said fence includes smooth ripples having ripple lengths substantially shorter than the length of the sealing fence.

15. A system for exchanging heat; comprising:

a heat transfer device for one of cooling or heating a fluid;

a pump/reservoir coupled to the heat transfer device for storing and pumping said fluid; and

a heat exchange panel coupled to the pump/reservoir and the heat transfer device, the heat exchange panel including a first layer, a second layer having a common border with the first layer, a border seal for sealing said first layer and said second layer at said border, a first port for receiving said fluid, a second port for issuing said fluid, and a dot matrix of attachments between said first layer and said second layer, said dot matrix organized for connecting dots of said dot matrix to nearest dots of said dot matrix, said first lines crossing said second lines at an angle in a range of about 70° to 110°.

16. The system of claim 15, wherein:

one of (i) said first lines and (ii) said second lines has an angle in a range of about 25° to 65° with respect to a nominal direction of a flow of said fluid.

17. The system of claim 15, wherein:

said border seal includes smooth ripples having ripple lengths substantially shorter than the length of said border.

18. The system of claim 15, wherein:

the heat exchange panel further includes at least one fence for sealing said first layer and said second layer between said first port and said second port.

19. The panel of claim 18, wherein:

said fence includes smooth ripples having ripple lengths substantially shorter than the length of said fence.